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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/561,582	03/07/2006	Christoph Brabec	21928-019US1	6468
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FISH & RICHARDSON PC P.O. BOX 1022 MINNEAPOLIS, MN 55440-1022			EXAMINER PATEL, REEMA	
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			2812	
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

TH

**Office Action Summary**

Application No.

10/561,582

Applicant(s)

BRABEC ET AL.

Examiner

Reema Patel

Art Unit

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**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --****Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 19 December 2005.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-17 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 19 December 2005 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date <u>3/7/06, 6/29/06</u> . | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Priority***

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

### ***Information Disclosure Statement***

2. The information disclosure statements (IDS) were submitted on 3/7/06 and 6/29/06. The submissions are in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statements have been considered by the examiner.

### ***Drawings***

3. New corrected drawings in compliance with 37 CFR 1.121(d) are required in this application because the Figure contains non-English text. Applicant is advised to employ the services of a competent patent draftsman outside the Office, as the U.S. Patent and Trademark Office no longer prepares new drawings. The corrected drawings are required in reply to the Office action to avoid abandonment of the application. The requirement for corrected drawings will not be held in abeyance.

### ***Specification***

The following guidelines illustrate the preferred layout for the specification of a utility application. These guidelines are suggested for the applicant's use.

#### **Arrangement of the Specification**

As provided in 37 CFR 1.77(b), the specification of a utility application should include the following sections in order. Each of the lettered items should appear in upper case, without underlining or bold type, as a section heading. If no text follows the section heading, the phrase "Not Applicable" should follow the section heading:

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- (a) TITLE OF THE INVENTION.
- (b) CROSS-REFERENCE TO RELATED APPLICATIONS.
- (c) STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT.
- (d) THE NAMES OF THE PARTIES TO A JOINT RESEARCH AGREEMENT.
- (e) INCORPORATION-BY-REFERENCE OF MATERIAL SUBMITTED ON A COMPACT DISC.
- (f) BACKGROUND OF THE INVENTION.
  - (1) Field of the Invention.
  - (2) Description of Related Art including information disclosed under 37 CFR 1.97 and 1.98.
- (g) BRIEF SUMMARY OF THE INVENTION.
- (h) BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING(S).
- (i) DETAILED DESCRIPTION OF THE INVENTION.
- (j) CLAIM OR CLAIMS (commencing on a separate sheet).
- (k) ABSTRACT OF THE DISCLOSURE (commencing on a separate sheet).
- (l) SEQUENCE LISTING (See MPEP § 2424 and 37 CFR 1.821-1.825. A "Sequence Listing" is required on paper if the application discloses a nucleotide or amino acid sequence as defined in 37 CFR 1.821(a) and if the required "Sequence Listing" is not submitted as an electronic document on compact disc).

### ***Claim Objections***

- 4. Claims 4, 5, 8 and 17 are objected to because of the following informalities:
  - Regarding claims 4 and 5, both of these claims are missing the article 'a' or 'an' in the phrase "is used as a donor" (claim 4) or "...is used as an acceptor" (claim 5).
  - Regarding claim 8, the word 'evaporate' should be 'evaporating.'
  - Regarding claim 17, the word "heterojunction" is missing the last letter 'n'.
- 5. Appropriate correction is required.

### ***Claim Rejections - 35 USC § 102***

- 6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

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A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 1-17 are rejected under 35 U.S.C. 102(b) as being anticipated by Brabec et al. ("The influence of materials work function on the open circuit voltage of plastic solar cells").

8. Regarding claim 1, Brabec et al. discloses the following claimed elements:

- A method for the production of organic solar cells or photodetectors, comprising the following steps:
  - A first organic n- or p-conductive semiconductor layer is applied to a first electrode (page 369, col 2, lines 1-2; Abstract);
  - To the solid first organic semiconductor layer is applied a second organic semiconductor layer of the respective other conductivity whose solvent partially dissolves the first organic semiconductor layer, such that a portion of the first semiconductor mixes with a portion of the second semiconductor to form a bulk heterojunction mixed layer (page 369, col 2, lines 3-6);
  - A second electrode is applied opposite the first electrode (Fig. 2, Abstract).

9. Regarding claim 2, Brabec et al. discloses that the solvent for each of the first and second organic semiconductor layers is matched to the solubility of the semiconductor to be deposited in that layer (page 369, col 1, lines 30-35).

10. Regarding claim 3, Brabec et al. discloses that the first organic semiconductor layer is effected by doctor-blading (page 369, col 2, lines 1-2).

11. Regarding claim 4, Brabec et al. discloses that a conjugated polymer is used as a donor (page 368, col 2, lines 1-8; Abstract).

12. Regarding claim 5, Brabec et al. discloses a soluble methanofullerene is used as an acceptor (page 368, col 2, lines 1-8; Abstract).

13. Regarding claim 6, Brabec et al. discloses the following claimed elements:

- A method for producing organic solar cells or photodetectors, comprising:
  - Applying a solution comprising a second organic semiconductor and a solvent on a first layer; the first layer comprising a first organic semiconductor that is at least partially soluble in the solvent (page 369, col 2, lines 1-2; Abstract);
  - Evaporating the solvent to form a second layer and a bulk heterojunction mixed layer between the first and second layers; the second layer comprising the second organic semiconductor and the bulk heterojunction mixed layer comprising a mixture of the first and second organic semiconductors (page 369, col 1, line 30 - col 2, line 18).

14. Regarding claim 7, Brabec et al. discloses disposing the first layer on a first electrode before applying the solution (page 370, col 1, line 19 – col 2, line 7; Fig. 2).

15. Regarding claim 8, Brabec et al. discloses disposing the second electrode on the second layer after evaporating the solvent (page 369, col 1, line 30 – col 2, line 6; Fig. 2).

16. Regarding claim 9, Brabec et al. discloses the solution is applied by doctor-blading (page 369, col 2, lines 1-18).
17. Regarding claim 10, Brabec et al. discloses the first organic semiconductor is a conjugated polymer (page 370, col 2, lines 1-4).
18. Regarding claim 11, Brabec et al. discloses the second organic semiconductor is a fullerene (page 368, col 2, lines 1-8; Abstract).
19. Regarding claim 12, Brabec et al. discloses the fullerene is a methanofullerene (page 368, col 2, lines 1-8; Abstract).
20. Regarding claim 13, Brabec et al. discloses the following claimed elements:
  - An organic solar cell or photodetector, comprising:
    - A first layer comprising a first organic semiconductor (page 369, col 2, lines 1-2; Fig. 2);
    - A second layer comprising a second organic semiconductor (page 369, col 2, lines 3-6; Fig. 2);
    - A heterojunction mixed layer disposed between the first and second layers; the heterojunction mixed layer comprising a mixture of the first and second organic semiconductors (page 369, col 2, lines 1-6; Fig. 2; Abstract).
21. Regarding claim 14, Brabec et al. discloses the first organic semiconductor is a conjugated polymer (page 370, col 2, lines 1-4).
22. Regarding claim 15, Brabec et al. discloses that the second organic semiconductor is a fullerene (page 368, col 2, lines 1-8; Abstract).

23. Regarding claim 16, Brabec et al. discloses that the fullerene is a methoanofullerene (page 368, col 2, lines 1-8; Abstract).

24. Regarding claim 17, Brabec et al. discloses that the first layer, second layer, and heterojunction mixed layer are disposed between first and second electrodes (Fig. 2).

### ***Conclusion***

25. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Petritsch et al. (U.S. 6,340,789 B1) discloses a photovoltaic device with multiple organic layers. Sariciftci et al. (U.S. 5,454,880), Brabec et al. ("Photovoltaic properties of conjugated polymer/methanofullerene composites embedded in a polystyrene matrix"), and Gebeyehu et al. ("Photovoltaic properties of conjugated polymer/fullerene composites on large area flexible substrates") disclose polymer and fullerene composites in photovoltaic systems.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Reema Patel whose telephone number is 571-270-1436. The examiner can normally be reached on M-F, 8:00-4:30 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Lebentritt can be reached on 571-272-1873. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.



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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

RSP  
5/21/07

SCOTT B. GEYER  
PRIMARY EXAMINER

*SBG* 5/24/07